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ABSTRACT

The case study is one of the most widely used tools in many disciplines including Information Management. At the same time the new Internet revolution has promoted online distance learning courses as never before. Many online courses are also incorporating the benefits of case studies into their course content. Case studies are now available online and case discussions can be conducted using asynchronous and synchronous online discussion tools. The online case study, or cybercase is an innovative pedagogical tool, however, more research is needed in regards to the issues surrounding the implementation of online case studies. The main objective of this paper is to analyze the use of online discussion methods for case study discussion. It discusses background issues regarding online cases, and the method for conducting an online case discussion. In particular, it investigates the idea that online case studies can be powerful learning tools in a distance learning environment. This study compares and contrasts traditional case discussions versus online case discussions. Some of the important questions explored in the present research are: What is the type of discussion that takes place in each setting? What is the level of discussion participation in an online case analysis? Is the quality of the discussions in online cases comparable to traditional discussions? What are the major similarities and differences in interaction and learning between an online case study discussion and traditional case discussion? and What is the most adequate instructor's role in the online case discussion environment? Includes six tables: case versions and dimensions; Bloom's Taxonomy; questions types in each category; question categories in each case version; mean rating for items; and mean ratings for key descriptions of case study. (Contains 43 references.) (Author)

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ED 474 084

TEACHING WITH ONLINE CASE STUDIES: IMPLEMENTATION AND EVALUATION ISSUES

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ABSTRACT

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INTRODUCTION

The case study is one of the most widely used tools in many disciplines including Information Management. The case study allows students to apply theoretical concepts to real world actual situations. Cases are an important component of the curriculum at important business schools (Tracy and Waldfogel 1997) such as Harvard Business School (Schmotter 2000, Chow 1992). At the same time the new Internet revolution has promoted online distance learning courses as never before. Many online courses are also incorporating the benefits of case studies into their course content. Case studies are now available online and case discussions can be conducted using asynchronous and synchronous online discussion tools. The online case study, or cybercase (Niederhauser 1999) is an innovative pedagogical tool, however, more research is needed in regards to the issues surrounding the implementation of online case studies.

The main objective of this paper is to analyze the use of online discussion methods for case study discussion. It discusses background issues regarding online cases, and the method for conducting an online case discussion. In particular, it investigates the idea that online case studies can be powerful learning tools in a distance learning environment. This study compares and contrasts traditional case discussions versus online case discussions. Finding a way to explain differences between electronic discussion and oral discussion has not been simple and many studies have compared multiple measures across both environments (LaGrandeur 1997). Some of the important questions explored in the present research are:

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What is the type of discussion that takes place in each setting?

What is the level of discussion participation in an online case analysis?

Is the quality of the discussions in online cases comparable to traditional discussions?

What are the major similarities and differences in interaction and learning between an online case study discussion and traditional case discussion?

What is the most adequate instructor's role in the online case discussion environment?

In addition, this study looks at how the method used in online discussion can affect the learning outcomes for students involved in an online distance learning environment.

THE CASE STUDY METHOD

The case study is a means of bringing in greater realism into the classroom (Lapierre 1996). Cases can be written by academics (Summers et al. 1990) or practitioners (Kellog 1985). Most cases include a thesis and argumentation but not always a conclusion (Gini 1985). The instructor's primary role is to prompt when necessary to ensure that critical issues are not overlooked. The instructor can also summarize the discussion and draw out the useful lessons and observations (Hammond et al. 1999).

Advantages of the case study include:

- *Vicarious learning*. Participants learn as critics or observers too.

  The lively interchange of ideas and opinions allows a much greater variety of interpretations of the case (Szpiro and Neufeld 1999). People can experience immediate feedback and reflect on their own perceptions (Niemyer 1995).

  Motivation. Participants are more likely to remember concepts used to solve real-life problems and being able to apply concepts rather than just learning textbook theories (Andrews and Noel 1986). The whole phenomenon of case-method teaching motivates instructors as well (McCraw 1999).

  Transfer. Cases give students experience that can be applied to subsequent cases, and on the job situations (Standridge 2000, Dorn 1999).

  Active participation. Case studies require less lecturing and more active learning (Standridge 2000).

  Cases yield generalizations and help students take ownership of knowledge (Robyn 1998).

  Cases promote the development of critical thinking skills (Capella and Robin 1986).

However, there are also some disadvantages (Stonham 1995) that include:

Cases are highly dependent on the instructional and educational characteristics of the instructor.

Case discussion can be difficult for a large class size (Mostert and Sudzina 1996).

Some students may have difficulties with writing.

Some physical setting may not be appropriate for the discussion.

Level of class preparation and complexity.

Student inexperience with case analysis.

A written case does not fully convey the complexity of the real situation (Andrews and Noel 1986).

Cases are a less efficient way to communicate content than other methods (Fulmer 1992).

IMPLEMENTING AN ONLINE DISCUSSION

There are two major options for implementing an on-line case study discussion: synchronous and asynchronous. Several studies (Davidson et al. 2000) have analyzed the quality of online interactions, both in chat rooms (synchronous mode) and bulletin boards (asynchronous mode). Chat room discussion allows for immediate feedback, while bulletin board discussions encourage students to provide thoughtful responses to posted questions. In this study, the bulletin board discussion mode was used because participants can elaborate on their answers and provide more insightful thoughts, however, future studies should evaluate the use of chat

rooms for case study discussions. The implementation of the online case discussion can vary depending on several factors including instructions given to students, discussion organization, instructor's participation, student participation requirements, and assessment of discussion participation (Bailey and Wright 2000).

The advantages of online discussions over face-to-face exchanges have been well documented in the research literature. Some of the advantages of online case studies include:

Online case studies can be linked to discussion boards, additional content material, online articles, web sites for additional information, or other resources.

Another dimension can be added by using online newspaper articles. Newspaper articles reflect the business conditions that decision-makers are facing (Schaupp and Lane 1992). Some online cases are even mainly based on newspaper or magazine articles that are available online. A progression of related news stories throughout a period of weeks could show the evolution of a major case issue.

All students have equal opportunity for participation. An online case discussion format can encourage timid students who did not participate in class to participate more actively and to express themselves. It is a more equitable, less stressful and non-threatening forum for discussions, especially for nonassertive personalities (Warschauer 1997).

Chat room discussion can overcome distance limitations by allowing external guests to participate in the case discussion. Students can prepare their questions ahead of time.

Participants can access the cases anytime over the Internet.

Accessibility, flexibility, group interaction, and opportunity for self-direction.

More available time to elaborate a response.

Online discussion can provide the opportunity for students to engage in thoughtful conversations, which may result in deeper understanding and greater learning gains (Irvine 2000). It encourages all students to formulate their thoughts at a deeper level (Bailey and Wright 2000).

Contributed responses become a repository available to other students.

Participants have more time to respond to answers because elapse time is much longer.

The amount of student contributions in comparison to instructor contribution is much higher.

Answers can be more elaborated, edited and carefully thought and phrased. Online discussions seem to promote rhetorical experimentation on the part of the participants (LaGrandeur 1997).

The same group can maintain simultaneously multiple discussions on different topics.

An online case discussion can be even more interactive than a traditional classroom case discussion.

The online instructor can selectively release content, can create multiple discussion groups, can provide private or public feedback.

A stimulus for increased written participation (Kern 1995).

An expanded access channel with possibilities for creating global learning networks (Cummins 1995). Online cases allow the participation of students from multiple countries in the same discussion therefore promoting a global perspective in education (de Wilde 1991). Online cases can be used in a multinational virtual environment (Zhao 1996).

Online cases do not have to be always presented in a written form (Niemyer 1995). Some online cases are multimedia rich and include audio and streaming video. Students should be able to re-expose themselves to the case description by re-playing, rewinding or by pausing the video case.

The implementation of online case discussion also involves major challenges such as:

Online discussion can be difficult for a large class size.

Some students may not be computer literate.

Hardware, software and other technical problems (Niederhauser 1999).

Lack of Internet access.

Limited availability of online cases.

The available bandwidth for a modem connection limits the size of video clips, sound clips, and inline images appropriate for an online case. As better technologies for streaming video become available, we should see more video cases available online.

THE CASE DIFFICULTY CUBE

Cases vary in terms of the volume and complexity of elements, some cases are full of facts, descriptions and quotes, other give little detailed information (Einsedel 1995). Some cases explicitly state the issues and problems, others do not, instead they provide symptoms or clues that suggest underlying problems (Einsedel 1995). Many authors have provided suggestions on effective use of different case study types, with different populations, and at different phases of learning (Romm and Mahler 1991). A different approach or objective calls for a different case type. The level of difficulty of a case can be determined by using the cube framework proposed by Erskine et al. (1981). The cube framework can be used to classify the different types of cases. The cube has three dimensions: analytical, conceptual, and presentation. Each of these dimensions can be divided into three degrees.

A. *The Analytical Dimension* This dimension is concerned with the task that the student must accomplish in the case. The three degrees of analytical difficulty can be summarized as follows:

   Level 1. Both the problem and the implemented solution are described. Evaluate the appropriateness of the solution.

   Level 2. The problem is defined, a feasible solution must be found.

   Level 3. A situation is described, neither the problem, nor a solution are defined.

As the level of analytical difficulty increases, so does the required analytical skills.

B. *The Conceptual Dimension* This dimension describes the complexity of the fundamental theoretical concept(s) underlying the case.

   Level 1. The concept, theory or technique is simple and straightforward. The concept or concepts in the case may be easily grasped by all the participants just by reading the case.

   Level 2. The concept or theory is of medimu difficulty. It is a combination of concepts, or may require further explanation by the instructor.

   Level 3. The concept is difficult, cross-functional or complex. Requires the active participation of the instructor to explain some of the concepts.

C. *The Presentation Dimension* This dimension is related to the amount of information that is given and how it is presented.

   Level 1. The amount of information required for analysis is small. The case is relatively short. The information is presented in a clear and straightforward way. There is almost no extraneous information in the case.

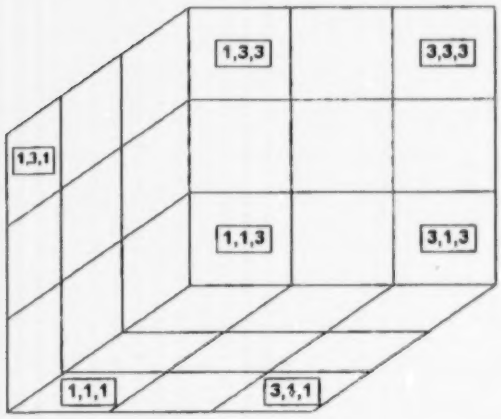
   Level 2. The case length is average, the information is clearly presented and some extraneous data is included in the information.

   Level 3. The case contains a large amount of information. The information may not be clearly presented, or they might be critical information missing. The case might include a large amount of extraneous information and may be less organized.

Figure 1 shows the Case Difficulty Cube (Erskine et al. 1981) and its three related dimensions. A case-based course would begin with cases ranked lower in difficulty along all three dimensions and gradually increase the level of difficulty along all three dimensions. The total number of combinations in the cube is 3 x 3 x 3 = 27.

One of our objectives is to determine how cases with various levels of complexity can be implemented as an online case study. Could certain dimension levels be

FIGURE 1
CASE DIFFICULTY CUBE



more suitable to an online case discussion? The implications for implementing an online discussion for a simple case might be different from implementing an online discussion for a complex and lengthy case. Therefore, in this study we implement online case discussions for varied case types. We decided to use multiple versions of the same case, instead of using multiple cases in order to provide some level of comparability. The same case is adapted to the particular dimension. In the present study we have simplified the framework for implementation purposes, and used only two levels for every dimension. The number of different case versions in this study is 2 x 2 x 2 = 8.

The case used in this study is called "Tradenet: Singapore's Computerization of International Trade, by B. S. Neo (1994). A modified version is available online.

A. *The Analytical Dimension*

Level 1. Both the problem faced by Singapore and the implemented solution are described. Students are expected to evaluate the appropriateness of the Tradenet solution.

Level 2. The problem faced by Singapore is defined, but the information related to the implemented solution was eliminated from the case. Students must figure out a feasible solution.

B. *The Conceptual Dimension*

Level 1. The focus of the case is on simple concepts such as the definition of EDI. Higher order concepts were removed from the original case version.

Level 2. The original case deals with more complex concepts such as defining a vision, co-operation, technology diffusion, partnership, focus effort, strategic alignment of information technologies, integration, implementation, stakeholder participation and identification of business needs. Specific lessons learned for each concept are described.

C. *The Presentation Dimension*

Level 1. All extraneous information was removed from the case. The case was made as short as possible without removing any relevant or important information.

Level 2. This version has the original case length.

Table 1 shows the eight different versions of the case. By modifying the case we were able to use the same case to represent multiple case types.

TYPES OF QUESTIONS BASED ON BLOOM'S TAXONOMY

As teachers we tend to ask questions in the "knowledge category 80% to 90% of the time. These questions are not bad, but using them all the time is. Try to utilize higher order level of questions. These questions require much more "brain power and a more extensive and elaborate answer. Below are the six question categories as defined by Bloom (1956).

Write questions that test skills other than recall. Research shows that most tests administered by Faculty rely too heavily on students' recall of information (Milton, Pollio, and Eison, 1986). Bloom (1956) argues that it is important for tests to measure higher learning as well. Fuhrmann and Grasha (1983, p. 170) have adapted Bloom's taxonomy for test development. Here is a condensation of their list and the kind of questions you should ask to measure each category.

TABLE 1
CASE VERSIONS AND DIMENSIONS

Case Version	*Analytical Dimension*	*Conceptual Dimension*	*Presentation Dimension*
111	1 (decision made)	1 (basic concepts)	1 (short version)
112	1 (decision made)	1 (basic concepts)	2 (long version)
121	1 (decision made)	2 (medium difficulty concept)	1 (short version)
122	1 (decision made)	2 (medium difficulty concept)	2 (long version)
211	2 (decision to be made)	1 (basic concepts)	1 (short version)
212	2 (decision to be made)	1 (basic concepts)	2 (long version)
221	2 (decision to be made)	2 (medium difficulty concept)	1 (short version)
222	2 (decision to be made)	2 (medium difficulty concept)	2 (long version)

TABLE 2
BLOOM'S TAXONOMY

KNOWLEDGE (common terms, facts, principles, procedures) remembering memorizing recognizing recalling identification recalling information who, what, when, where, how ...? describe	**COMPREHENSION** (understanding of facts and principles, interpretation of material) interpreting translating from one medium to another describing in one's own words organization and selection of facts and ideas retell...
APPLICATION (solving problems, applying concepts and principles to new situations) problem solving applying information to produce some result use of facts, rules and principles how is ... an example of ..? how is ... related to ...? why is ... significant?	**ANALYSIS** (recognition of unstated assumptions or logical fallacies, ability to distinguish between facts and inferences) subdividing something to show how it is put together finding the underlying structure of a communication identifying motives separation of a whole into component parts what are the parts or features of ..? classify ... according to ... outline/diagram ... how does ... compare/contrast with ...? what evidence can you list for ...?
SYNTHESIS (integrate learning from different areas or solve problems by creative thinking) creating a unique, original product that may be in verbal form or may be a physical object combination of ideas to form a new whole what would you predict/infer from ...? what ideas can you add to ...? how would you create/design a new ...? what might happen if you combined ...? what solutions would you suggest for ...?	**EVALUATION** (judging and assessing) making value decisions about issues resolving controversies or differences of opinion development of opinions, judgements or decisions do you agree that ...? what do you think about ...? what is the most important ..? place the following in order of priority ... how would you decide about ...? what criteria would you use to assess ...?

TABLE 3
QUESTIONS TYPES IN EACH CATEGORY

KNOWLEDGE	COMPREHEND	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION
Define	Convert	Demonstrate	Diagram	Categorize	Appraise
Describe	Defend	Modify	Differentiate	Combine	Compare
Identify	Distinguish	Operate	Distinguish	Compile	Conclude
Label	Estimate	Prepare	Illustrate	Devise	Contrast
List	Explain	Produce	Infer	Design	Criticize
Match	Extend	Relate	Point out	Explain	Describe
Name	Generalize	Show	Relate	Generate	Discriminate
Outline	Give examples	Solve	Select	Organize	Explain
Reproduce	Infer	Use	Separate	Plan	Justify
Select	Predict		Subdivide	Rearrange	Interpret
State	Summarize			Reconstruct	Support
				Revise	
				Tell	

TABLE 4
QUESTION CATEGORIES IN EACH CASE VERSION

Case Version	Knowledge	Comprehend	Application	Analysis	Synthesis	Evaluation
111	✓✓	✓✓				✓
112	✓	✓✓✓			✓	
121	✓	✓		✓✓	✓	
122	✓	✓✓		✓		✓
211	✓	✓		✓✓		✓
212	✓	✓		✓	✓	✓
221	✓	✓		✓	✓	✓
222	✓	✓		✓	✓	✓

Many faculty members have found it difficult to apply this six-level taxonomy, and some educators have simplified and collapsed the taxonomy into three general levels (Crooks, 1988): The first category knowledge (recall or recognition of specific information). The second category combines comprehension and application. The third category is described as "problem solving, transferring existing knowledge and skills to new situations.

Another objective of this study is to determine which question categories are easier to implement in an online case discussion. The implications may vary if you are answering a simple Knowledge category question or answering a difficult synthesis question. Therefore, in this study we use questions from every category from Bloom's taxonomy. We came up with a list of 40 different questions. Each one of the eight case versions has five totally different questions from multiple categories. For example, case version 212 includes one knowledge question, one comprehension question, one analysis question, one synthesis question, and one evaluation question.

IMPLEMENTATION OF THE STUDY

This case study was administered to 90 students in a junior computer information systems class during Spring 2001. The student formed their own teams of three students each based on their own preferences. Each team was assigned a different version of the Tradenet case at random. Every team had a separate bulletin board area for discussion. Students could only see postings from their own team members.

The content of the course included 9 short cases. These cases were discussed several weeks prior to the TRADENET case, therefore, students were already familiar with online case study discussion and with posting techniques. Several versions of the TRADENET

case study were posted along with guided questions. Data sources for this study include responses to case studies, interactions between students, and feedback survey results. Data sources consist of transcripts of all online case discussions, results of a feedback attitude surveys and a computer background survey.

STUDENT EVALUATION OF THE CASE DISCUSSION

A previously used method to evaluate the effectiveness of the case study discussion is to use an evaluation questionnaire (Raju et al. 2000, Raju et.al. 1999). A student survey was conducted at the end of the semester to assess the effectiveness of the online case discussion and to evaluate the students' perceptions of the case discussion Student were encouraged to be honest and completion of the questionnaire was completely optional. A total of 74 students completed the evaluation questionnaire. Students were also surveyed regarding their computer background and Internet skills, as well as their attitudes toward online learning.

TABLE 5
MEAN RATINGS FOR ITEMS

ITEM	MEAN
I improved my understanding of basic EDI concepts after reading the case.	4.10
I learned to value other students' point of view.	3.96
I learned to inter-relate important topics and ideas after reading the case.	3.94
The case improved my ability to integrate. technical and managerial issues	3.90
The case has helped me become more confident in expressing ideas.	3.89
My ability to evaluate critically technical and managerial alternatives has improved.	3.83
I feel my ability to integrate technical and managerial issues has improved.	3.81
The case motivated me to learn more about EDI.	3.74

The first part of the questionnaire asked the respondents to indicate the extent of their agreement with 8 evaluatory statements on a 5-point Likert scale. The response scale ranged from 1 which represented the least favorable response of strongly disagree, to 5 which represented the most favorable response of strongly agree. The following table illustrates the overall positive reaction to the various aspects of the TRADENET case study. The reaction of the students to the case was favorable, all questions yielded means of 3.7 or above. In other words, the students positively rated all items.

TABLE 6
MEAN RATINGS FOR
KEY DESCRIPTIONS OF CASE STUDY

THE CASE WAS...	MEAN
interesting	4.17
relevant	4.14
helpful	4.04
useful	4.03
meaningful	4.01
appropriate	3.99
valuable	3.94
clear	3.94
important	3.93
practical	3.90
engaging	3.90
challenging	3.82
easy to understand	3.82
exciting	3.49
difficult	3.01

ANALYSIS OF DATA

Every posting was analyzed to determine the quality of the contribution and whether participation was substantive (Davidson-Shivers et al. 2000). A full analysis of each question was made. The criteria used for assigning points (grades) to the answers was based on the following three levels.

Level 3: The answer is specific and thorough

Level 2: The answer has been attempted but the answer is clearly lacking in thoroughness

Level 1: The answer has been attempted

The complete statistical of the data will be provided in the final version of this paper.

SUBSEQUENT ANALYSIS

In a study by LaMaster and Morley (1999) participants were encouraged to respond to the cases and questions by posting replies. Students enjoyed the general forum, with all messages posted to one main site, while mentors preferred small group forums.

A study by Steinkuehler et al. (2000) compared the effects of three forms of online instruction on memory, belief change, and argumentation skill. Reading of a pro/con text was followed by: (1) online discussion in pairs compared to reading of the same text followed by two forms of individualized study techniques derived from the cognitive memory literature; (2) self-explanation; and (3) repeated summarization and study. Results were analyzed in terms of argument change from pretest to posttest, transfer of argument skills, text recall, reported and directly assessed opinion change, and perceptions of productivity and participation. Qualitative analysis of the transcripts from the online activities examined time on task, effects of pair agreement or disagreement, and unequal participation within the pairs.

Other methods used for data analysis include the constant comparative method (Murphy et al. 1998). Another study by McDonald (1998) focused on the following variables.

the level (quantity) of participation

the relationship among and between messages

the functions of the interactions (cognitive, meta-cognitive, social, organizational) and determine if the pattern of those functions changed

the characteristics and patterns of interpersonal interactions

We will apply content analysis techniques to the transcribed discussions in order to examine several variables, including level of participation, amount of interaction, and cognitive skills. Transcripts of the case answers will be analyzed within and across groups using a coding scheme based on a content analysis model for dimensions of the learning process by Henry (1992). We will also generate a set of code words found in each case discussion and visual maps (latice graphs) with conceptual hierarchies to relate this data. Content analysis of computer-mediated communication has been used in previous studies of online discussions (Hara et.al. 2000).

CONCLUSION

This paper has described the unique aspects of online case studies and major advantages and disadvantages. The framework for this study has been described in detail. Analysis of the data is currently in progress. Results from this research-in-progress should provide insights about the level of discussion participation in an online case analysis, the quality of the discussions in online cases. Other issues include interaction and learning in an online case study discussion and the role of the instructor in the online case discussion environment.

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